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(54) WATER-BASE INK COMPOSITION**(57)Abstract:**

PROBLEM TO BE SOLVED: To obtain a water-base ink composition which can give characters and drawn lines not undergoing blurring or erasing when wetted with sweat, having light resistance high enough to prevent characters or drawn lines from being denatured stably for a long time against precipitation by using a fluid obtained by emulsionpolymerizing a vinyl monomer containing a dissolved hydrophobic dye.

SOLUTION: This composition contains an aqueous microparticulate colored resin dispersion prepared by emulsion-polymerizing a vinyl monomer containing a dissolved hydrophobic dye in the presence of a polymerizable surfactant. It comprises 3-30wt.% (in terms of the solid component of the resin), based on the total weight of the composition, aqueous microparticulate colored resin dispersion, 10-80wt.% water-soluble organic solvent and 30-90wt.% water. It is desirable that the particle diameter of the colored resin microparticles is 0.5 μ m or smaller. It can be effectively used in an ink jet recorder or a writing utensil.

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CLAIMS

[Claim(s)]

[Claim 1] The water-color-ink constituent which consists of containing the aqueous dispersion liquid of the coloring resin particle prepared by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color using a polymerization nature surfactant.

[Claim 2] The water-color-ink constituent whose content of 10 - 80 % of the weight and water it is the water-color-ink constituent which consists of containing the aqueous dispersion liquid of the coloring resin particle prepared by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color using a polymerization nature surfactant, and the content of 3 - 30 % of the weight (resin solid content conversion) and a water-soluble organic solvent is 30 - 90 % of the weight to the water-color-ink constituent whole quantity concerned for the content of the aqueous dispersion liquid of a coloring resin particle.

[Claim 3] The water-color-ink constituent according to claim 2 which consists of the particle diameter of said coloring resin particle being 0.5 micrometers or less.

[Claim 4] the ink jet recording device of claim 1-3 given in any 1 term -- service water -- a sex ink constituent.

[Claim 5] the writing implement of claim 1-3 given in any 1 term -- service water -- a sex ink constituent.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to a water-color-ink constituent. the ink jet recording apparatus which can be used in more detail with the recording apparatus of the ink jet method which can obtain this invention commercially -- service water -- the blot at the time of a sex ink constituent and a note -- there is nothing -- a writing implement useful to writing implements, such as a felt-tipped marker and a ball-point, -- service water -- it is related with a sex ink constituent.

[0002]

[Description of the Prior Art] As a conventional ink constituent for ink jet recording devices, water-soluble acid dye, basic dye, etc. are dissolved into an aquosity medium, and the ink constituent which comes to add additives, such as a wetting agent, pH modifier, and antiseptics, is known.

[0003] However, the printing section spreads and these ink constituent has the fault that an image becomes indistinct, or the image with which the color was recorded for water solubility produces a blot with sweat or water, disappear, and a color becomes muddy with color mixture. Originally, water soluble dye is inferior in lightfastness, and when it saves printed matter for a long period of time, it has the problem that an image deteriorates. Moreover, by prolonged preservation, copy printing, etc., the physical properties of ink change, or these ink constituent produces precipitate, and the blinding and the regurgitation of a nozzle have the fault of generating a lifting and poor printing, in a remarkable failure.

[0004] Moreover, the color and the pigment are conventionally known as a coloring component of the water color ink used for writing implements, such as an aquosity felt-tipped marker and an aquosity ball-point.

[0005] The ink which used the color has the fault to which the alphabetic character and line which the alphabetic character and the line spread, or disappeared and took notes of with sweat or water for water solubility [color] become indistinct, and the so-called water resisting property is inferior in it. Moreover, since the color itself is inferior in lightfastness, there is a problem that an alphabetic character and a line deteriorate between long periods of time.

[0006] On the other hand, although a problem does not have ink which used the pigment about a water resisting property or lightfastness, between long periods of time, a pigment condenses, or it sediments and the problem of the blinding of a nib and poor writing generates it. Moreover, as ink for writing implements, since differential powder-ization of a pigment is required, it is in a difficult situation to distribute various organic pigments and to increase the color number of ink.

[0007]

[Problem(s) to be Solved by the Invention] The technical problem which this invention tends to solve is solving the conventional above-mentioned fault and above-mentioned conventional trouble of the ink constituent for ink jet recording apparatus, and is offering the water-color-ink constituent which gives the clear image with which it has sufficient concentration for ink jet record in the 1st, and the printing section's does not spread. Moreover, it is offering the water-color-ink constituent which the image recorded [2nd] by water and sweat produces a blot, or does not disappear. It is offering the water-color-

ink constituent in which a color's does not become [3rd] muddy with color mixture. It is offering the water-color-ink constituent excellent in the lightfastness in which an image's does not deteriorate even if it saves [4th] printed matter for a long period of time. It is offering the stable water-color-ink constituent which does not produce [5th] change or precipitate of physical properties.

[0008] furthermore, the writing implement of the above-mentioned former [technical problem / which this invention tends to solve] -- service water -- it is solving the fault and trouble of sex ink, and is offering the stable water-color-ink constituent which gives clear alphabetic character and line to which an alphabetic character and a line spread or disappear neither by water nor sweat, and is excellent in the lightfastness in which an alphabetic character and a line do not deteriorate for a long period of time, and precipitate's does not produce.

[0009]

[Means for Solving the Problem] As a result of repeating various examination that said technical problem should be solved, by using the liquid obtained by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color, this invention persons succeed in obtaining the water-color-ink constituent which solved the above-mentioned technical problem, and came to complete this invention.

[0010] The water-color-ink constituent of this invention consists of containing the aquosity dispersion liquid of the coloring resin particle prepared by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color using a polymerization nature surfactant.

[0011] Moreover, the water-color-ink constituent of this invention contains the aquosity dispersion liquid of the coloring resin particle prepared by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color using a polymerization nature surfactant, and, for the content of the aquosity dispersion liquid of a coloring resin particle, the content of a water-soluble organic solvent is [the content of water] 30 - 90 % of the weight ten to 80% of the weight to the ink constituent whole quantity three to 30% of the weight (resin solid content conversion).

[0012] It is desirable that the particle diameter of said coloring resin particle is 0.5 or less. Moreover, if the water-color-ink constituent of this invention is used for an ink jet recording device or a writing implement, it is effective.

[0013] In addition, the aquosity dispersion liquid of a coloring resin particle are coloring emulsion-polymerization liquid obtained by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color using a polymerization nature surfactant.

[0014]

[Embodiment of the Invention] The aquosity dispersion liquid of a coloring resin particle with a particle diameter [concerning the water-color-ink constituent of this invention] of 0.5 micrometers or less make a polymerization initiator the vinyl monomer which dissolved the hydrophobic color for ammonium persulfate, potassium persulfate, a hydrogen peroxide, etc., or if required, will be made into an initiator in the form which uses a reducing agent together, and will be prepared according to the emulsion polymerization using a polymerization nature surfactant.

[0015] the aquosity dispersion liquid (usually obtained as a strong solution of 20 - 50 % of the weight of resin solid content) of the coloring resin particle obtained as mentioned above -- the object for ink jet recording devices, or a writing implement -- service water -- in order to consider as a sex ink constituent, it dilutes with water and a water-soluble organic solvent, and resin solid content (polymer particle) is prepared to 3 - 30% of the weight among a water-color-ink constituent.

[0016] Although the aquosity dispersion liquid of the coloring resin particle concerning the water-color-ink constituent of this invention are condensed or do not precipitate, when usually using as the object for ink jet recording devices which can search for more advanced stability, or an ink constituent for writing implements, it is desirable for the particle diameter of a coloring resin particle to be 0.5 micrometers or less. Moreover, when an ink constituent passes a thin nozzle or a thin nib like a felt pen, also in order not to start blinding, it is desirable for the particle diameter of a coloring resin particle to be 0.5 micrometers or less.

[0017] Especially the vinyl monomer used for preparation of the aquosity dispersion liquid of the

coloring resin particle concerning the water-color-ink constituent of this invention is not restricted. For example, a methyl acrylate, an ethyl acrylate, acrylic-acid n-propyl, Acrylic ester, such as acrylic-acid n-butyl, a methyl methacrylate, Methacrylic ester, such as ethyl methacrylate, methacrylic-acid n-propyl, and n-butyl methacrylate Vinyl acetate, vinyl propionate, vinyl butyrate, benzoic-acid vinyl, One or more kinds are chosen from hydrophobic monomers, such as styrene, such as olefins, such as vinyl ester, such as salicylic-acid vinyl, a butadiene, an isoprene, and a propylene, styrene, and methyl styrene, and an emulsion polymerization is presented. Moreover, the hydrophilic monomer which has hydrophilic functional groups, such as an amino group, a carboxyl group, a sulfone radical, an amide group, and a hydroxyl group, may be preferably blended within limits which do not spoil an emulsion polymerization within 50 % of the weight (as opposed to the vinyl monomer whole quantity). Moreover, the polyfunctional monomer which has the monomer and two vinyl groups or more which have reactant bridge formation radicals, such as an epoxy group, a hydroxy methylamide radical, and an isocyanate radical, as a cross linking agent may be blended.

[0018] If the polymerization nature surface active agent used for preparation of the aqueosity dispersion liquid of the coloring resin particle concerning the water-color-ink constituent of this invention is a compound which has a vinyl group and has a surface (interface) activity operation, there will be especially no limit and there will be no limit also in the ionicity of an anion, a cation, and Nonion. For example, "ADEKA rear soap NE-10" by Asahi Denka Kogyo K.K., "said NE-20", "said NE-30", "said NE-40", "said SE-10N", the "radio-and-TV mull S-180" by Kao Corp., "said S-180A", "this S-120A", etc. are mentioned, and it is used combining one kind or two kinds or more from the inside. The amount of the polymerization nature surface active agent used has 0.1 - 50 desirable % of the weight to a vinyl monomer.

[0019] The hydrophobic color of the monoazo dissolved in many organic solvents other than water, an anthraquinone system, metallic complex mold monoazo, diazo **, a phthalocyanine system, and a triaryl methane system is suitable for the hydrophobic color used for preparation of the aqueosity dispersion liquid of the coloring resin particle concerning the water-color-ink constituent of this invention. For example, Mitsubishi Chemical "DIARESINYELLOW C" [CI Solvent Yellow 103], "ORIENT OIL SCARLET #308" made from "DIARESEN YELLOW A" and ORIENT Chemical industry [CI Solvent Red18], "AIZEN SPILON BLUE2B NH" by Hodogaya Chemical Co., Ltd. [CI Solvent blue 117], "VALI FAST BLACK #3840" made from "AIZEN SPILON BLUE GNH" ORIENT Chemical industry [CI Solvent Black 27], "VALI FASTBLACK #1802" etc. is mentioned. The loadings of the color at the time of an emulsion polymerization are 0.2 - 50% of the weight of the range to the monomer whole quantity.

[0020] As a water-soluble organic solvent used for the water-color-ink constituent of this invention Ethylene glycol, triethylene glycol, tetraethylene glycol, Dipropylene glycol, 1, 2-propanediol, 1, 3-prong pan diol, 1, 2-butanediol, 2, 3-butanediol, 1,3-butanediol, 1,4-butanediol, 1, 2-pentanediol, 1,5-pentanediol, 2, 5-hexandiol, 3-methyl 1,3-butanediol, 2 methyl pentane -2, 4-diol, 3-methylpentane-1,3,5-triol, 1 and 2, 3-hexane triol, Alkylene glycol, such as a glycerol, a polyethylene glycol, Polyalkylene glycols, such as a polypropylene glycol, glycerol, Glycerol, such as a JIGURISE roll and triglycerol, ethylene glycol monomethyl ether, Ethylene glycol monoethyl ether, the diethylene-glycol monomethyl ether, Low-grade alkyl ether [of glycols, such as diethylene glycol monoethyl ether and diethylene-glycol mono--n-butyl ether,], thiodiethanol, N-methyl-2-pyrrolidone, 1, and 3-dimethyl-2-imidalidinone etc. is mentioned. The content has 10 - 80 desirable % of the weight to the ink constituent whole quantity, and is 10 - 60 % of the weight more preferably.

[0021] In addition, water soluble solvents, such as ketones, such as amides, such as alcohols, such as methyl alcohol, ethyl alcohol, isopropyl alcohol, n-butyl alcohol, tert-butyl alcohol, isobutyl alcohol, hexyl alcohol, octyl alcohol, nonyl alcohol, decyl alcohol, and benzyl alcohol, dimethylformamide, and a diethyl acetamide, and an acetone, are also mixable, for example.

[0022] Moreover, the content of water has 30 - 90 desirable % of the weight to the ink constituent whole quantity, and is 40 - 80 % of the weight more preferably. In addition, antiseptics, pH regulator, an activator, lubricant, a defoaming agent, a rust-proofer, etc. can be used if needed, choosing them

suitably.

[0023] For example, the hydroxide of alkali metal, such as an alkali-metal salt of carbonic acid or a phosphoric acid, sodium hydroxides, etc., such as ammonia, a urea, monoethanolamine, diethanolamine, triethanolamine, Triethanolamine sodium, and a sodium carbonate, etc. is raised as a pH regulator.

[0024] As antiseptics or an antifungal agent, a phenol, sodium OMAJIN, pentachlorophenol sodium, 1, 2-bends iso thiazoline 3-ON, 2, 3 and 5, 6-tetra-clo low 4 (methyl FONIRU) pyridine, the alkali-metal salt of a benzoic acid, a sorbic acid, or a dehydroacetic acid, a benzimidazole system compound, etc. are raised.

[0025] As lubricant, polyether denaturation silicone, such as fluorochemical surfactants, such as polyalkylene glycol derivatives, such as the polyoxyethylene lauryl ether, fatty-acid alkali salt, the Nonion system surface active agent, and perfluoroalkyl phosphoric ester, and a polyethylene-glycol addition product of dimethylpolysiloxane, etc. is raised.

[0026] Since it was obtained from the emulsion-polymerization liquid which carried out the emulsion polymerization under existence of a polymerization nature surfactant and the surface active substance hardly exists in an aqueous medium as compared with what was obtained using the conventional surfactant, the aqueous dispersion liquid of the coloring resin particle concerning the water-color-ink constituent of this invention become what has high surface tension (usually 40 or more dyn/cm). Therefore, when the aqueous dispersion liquid of the coloring resin particle of this invention are used as an ink constituent for ink jet recording devices, while becoming possible to obtain the clear image with which the printing section does not spread, it becomes possible to obtain a coat with the water resisting property which an image spreads by water or sweat or does not disappear. On the other hand, when the aqueous dispersion liquid of the coloring resin particle of this invention are used as ink for writing implements, an alphabetic character and a line serve as a line coat which is clear, spreads, disappears neither by water nor sweat, and has a water resisting property.

[0027] Coloring of a resin particle dissolves a hydrophobic color into a vinyl monomer beforehand, is performed by carrying out an emulsion polymerization after that, and comes to present a color skillful in a resin particle by this. thus, the aqueous dispersion liquid of the obtained coloring resin particle -- an ink jet recording device -- service water -- it becomes possible to offer the outstanding ink in which a color does not become muddy with color mixture, without obtaining the clear image with which the printing section does not spread, and an image's spreading by water or sweat or disappearing, when it uses as a sex ink constituent. Moreover, it becomes possible to offer ink excellent in the lightfastness in which an image does not deteriorate even if it saves printed matter for a long period of time. Moreover, it becomes possible to offer the ink which was clear as for the alphabetic character and the line when it used as ink for writing implements, spread by water or sweat, or did not disappear, and was excellent. The amount of the color used is usually 0.2 - 50% of the weight of the range to the vinyl monomer whole quantity.

[0028] The coloring resin particle concerning the water-color-ink constituent of this invention is not substantially dissolved to water. In the water-color-ink constituent of this invention, it is characterized by carrying out the emulsion polymerization of the vinyl monomer in which this coloring resin particle dissolved the hydrophobic color using a polymerization nature surfactant, and being prepared.

[0029]

[Example] Hereafter, about the case where the water-color-ink constituent of this invention is used for an ink jet recording device, an example and the example of a comparison are shown and the water-color-ink constituent of this invention is further explained to a detail.

[0030] The performance test in each example followed the following approach.

** Extent of a blot of the alphabetic character which was seen and was printed to :PPC copy paper was judged by viewing.

O : -- **: not spreading -- water resisting property which spreads slightly and x: spreading :P The alphabetic character printed to PC copy paper was immersed in water for 1 hour, and extent of a blot was judged by viewing.

O : -- **: not spreading -- lightfastness which spreads slightly and x: spreading :P The alphabetic

character printed to PC copy paper was irradiated for fade meter 20 hours, and it judged whether fading would be accepted.

Preservation stability: The cartridge filled up with the ink constituent was put in into the 50-degree C thermostat, and days until printing becomes impossible were measured.

[0031] Particle diameter, viscosity, and surface tension were measured by the following approach.

Particle diameter: The particle diameter of a coloring resin particle was measured using the laser dispersion type particle-size-distribution measurement machine (the Nikkiso Co., Ltd. make, a Coulter counter, model N4SD).

** Whenever: The measurement temperature which measured the viscosity of the aqueous dispersion liquid of a coloring resin particle using the cone plate mold rotational viscometer (the Tokyo Keiki Co., Ltd. make, ELD mold) was 25 degrees C.

Surface tension: The surface tension of the aqueous dispersion liquid of a coloring resin particle was hung, and was measured by the plate method. Measurement temperature was 25 degrees C.

[0032] The temperature up of the inside ** was carried out to 80 degrees C, having attached an agitator, a reflux condenser, a thermometer, nitrogen gas installation tubing, and 500ml separating funnel for a monomer injection, having set to the warm water tub, having taught 500g of distilled water to the flask of 12l. of examples, and introducing nitrogen gas into it. On the other hand, churning distribution of the vinyl monomer mixture which consists of 250g of methyl methacrylates, 200g of n-butyl methacrylate, and 50g of methacrylic acids, oil solubility red color ["ORIENT OIL SCARLET #308" made from ORIENT Chemical industry] 10g, 250g of distilled water, and the polymerization nature surface-active-agent ["ADEKA rear soap SE-10N" by Asahi Denka Kogyo K.K.] 20g was mixed and carried out, and the mixed liquor in which 1g of ammonium persulfates was dissolved further was prepared. It added over 3 hours under churning in the flask which maintained this mixed liquor near the temperature of 80 degrees C from the above-mentioned separating funnel, the polymerization was ended in the 5th hour, and the aqueous dispersion liquid of a red resin particle were obtained. When 3000g [of distilled water] and propylene glycol 1000g was added to these aqueous dispersion liquid and having been agitated to homogeneity, the red ink constituent of viscosity 2.8cp and surface tension 54 dyn/cm was obtained. The particle diameter of the coloring resin particle in a red ink constituent was 0.20 micrometers.

Moreover, the red ink constituent had the water resisting property and the property excellent in lightfastness, spread and presented clear red without blinding.

[0033] The temperature up of the inside ** was carried out to 80 degrees C, having attached an agitator, a reflux condenser, a thermometer, nitrogen gas installation tubing, and 500ml separating funnel for a monomer injection, having set to the warm water tub, having taught 500g of distilled water to the flask of 22l. of examples, and introducing nitrogen gas into it. the monomer mixture which consists of styrene 200g, 200g of n-butyl methacrylate, and 100g of acrylic acids on the other hand, and oil solubility -- blue -- churning distribution of color ["AIZEN SPILON BLUE 2BNH" by Hodogaya Chemical Co., Ltd.] 15g, 250g of distilled water, and the polymerization nature surfactant ["radio-and-TV mull S-180" by Kao Corp.] 10g was mixed and carried out, and the mixed liquor in which 2g of ammonium persulfates was dissolved further was prepared. This mixed liquor was added over 3 hours under churning in the flask which maintained the above-mentioned separating funnel to temperature near 80 degree C, the polymerization was ended in the 5th hour, and the aqueous dispersion liquid of a blue resin particle were obtained. 3000g [of distilled water] and propylene glycol 1000g was added to these aqueous dispersion liquid, it agitated to homogeneity, and the blue ink constituent of viscosity 3.2cp and surface tension 52 dyn/cm was obtained. The particle diameter of the coloring resin particle in a blue ink constituent was 0.24 micrometers. Moreover, the blue ink constituent had the water resisting property and the property excellent in lightfastness, spread and presented clear blue without blinding.

[0034] Example of comparison 1 water-solubility acrylic resin ["JONCRYL 61J" (30% of solid content) made from Johnson Polymer] 25g, water-soluble red color ["AIZEN CATHILON PINK FGH" by Hodogaya Chemical Co., Ltd.] 2g, propylene glycol 10g, and 63g of distilled water were mixed, and the red ink constituent was obtained by carrying out the churning dissolution for 1 hour.

[0035] the example of a comparison -- blue 2 water solubility -- color ["AIZEN VICTORIAPURE

BLUE BOH" by Hodogaya Chemical Co., Ltd.]1g, propylene glycol 10g, and 89g of distilled water were mixed, and the blue ink constituent was obtained by carrying out the churning dissolution for 1 hour.

[0036] The red ink constituent was manufactured on the same conditions as an example 1 except having changed example of comparison 3 pile affinity surface-active-agent ["ADEKA rear soap SE-10N" by Asahi Denka Kogyo K.K.]20g into 5g of sodium dodecylbenzenesulfonate, and a polyoxyethylene nonylphenyl ether 5g surface active agent. This red ink constituent was viscosity 3.1cp and surface tension 37 dyn/cm. The particle diameter of the coloring resin particle in an ink constituent was 0.25 micrometers.

[0037] Without dissolving an oil color in the monomer mixture of example of comparison 4 example 1, the emulsion polymerization was carried out on the same conditions and the aquosity dispersion liquid of a non-colored resin particle were obtained. Then, water-soluble red color ["AIZEN CATHILON PINK FGH" by Hodogaya Chemical Co., Ltd.]5g, 3000g [of distilled water], and propylene glycol 1000g was added to these aquosity dispersion liquid, it agitated to homogeneity, and the red ink constituent was obtained.

[0038] The result obtained in each example and the example of a comparison is shown in Table 1.

[0039]

[Table 1]

表 1

	実施例 1	実施例 2	比較例 1	比較例 2	比較例 3	比較例 4
滲 み	○	○	△	×	△	△
耐 水 性	○	○	×	×	△	△
耐 光 性	優	優	不可	不可	優	不可
保存安定性	180日 以上	180日 以上	180日 以上	180日 以上	180日 以上	45 日 固 化

[0040] Hereafter, about the case where the water-color-ink constituent of this invention is used for a writing implement, an example and the example of a comparison are shown and the water-color-ink constituent of this invention is further explained to a detail.

[0041] The performance test in each example followed the following approach.

** Extent of a blot of the alphabetic character which was seen and was drawn on :writing paper was judged by viewing.

O : don't spread.

** : Spread slightly.

x: Spread.

Water resisting property: The alphabetic character drawn on writing paper was immersed in water for 1 hour, and extent of a blot was judged by viewing.

O : don't spread.

** : Spread slightly.

x: Spread.

Lightfastness: The alphabetic character drawn on writing paper was irradiated for 20 hours at fade meter, and it judged whether fading would be accepted.

Preservation stability: The aquosity felt-tipped marker container was filled up with the ink constituent, it put in into the 50-degree C thermostat, and days until it becomes impossible writing down were measured.

[0042] Particle diameter: The particle diameter of a coloring resin particle was measured using the laser dispersion type particle-size-distribution measurement machine (the Nikkiso Co., Ltd. make, coal tar

model N4SD).

Viscosity: The viscosity of an ink constituent was measured using the cone plate mold rotational viscometer (Tokyo Keiki Co., Ltd., ELD mold). Measurement temperature was 25 degrees C.

Surface tension: The surface tension of an ink constituent was hung and was measured by the plate method. Measurement temperature was 25 degrees C.

[0043] The temperature up of the inside ** was carried out to 80 degrees C, having attached an agitator, a reflux condenser, a thermometer, nitrogen gas installation tubing, and 500ml separating funnel for a monomer injection in the flask of 32l. of examples, having set to the warm water tub, having prepared 500g of distilled water, and introducing nitrogen gas. The mixed liquor which made 500g of monomer mixture which consists of 250g [of methyl methacrylates] and styrene 200g and 50g of methacrylic acids mix and carry out churning distribution of oil solubility red color ["ORIENT OIL SCARLET #308" made from ORIENT Chemical industry] 8g, 250g of distilled water, and the polymerization nature surface-active-agent ["ADEKA rear soap SE-10N" by Asahi Denka Kogyo K.K.]20g, and, on the other hand, dissolved 1g of ammonium persulfates in it further was prepared. It added over 3 hours under churning in the flask which maintained this mixed liquor near the temperature of 80 degrees C from the above-mentioned separating funnel, the polymerization was ended in the 5th hour, and the aqueosity dispersion liquid of a coloring resin particle were obtained. 3000g [of distilled water] and propylene glycol 1000g was added to the aqueosity dispersion liquid of the obtained coloring resin particle, it agitated to homogeneity, and the red ink constituent of viscosity 2.8cP and surface tension 54 dyn/cm was obtained. The alphabetic character in which the pen using the obtained red ink constituent was not generated, but notes of blinding was taken was excellent in a water resisting property and lightfastness, and presented clear red without a blot. The particle diameter of the coloring resin particle in a constituent was 0.15 micrometers.

[0044] The temperature up of the inside ** was carried out to 80 degrees C, having attached an agitator, a reflux condenser, a thermometer, nitrogen gas installation tubing, and 500ml separating funnel for a monomer injection in the flask of 42l. of examples, having set to the warm water tub, having prepared 500g of distilled water, and introducing nitrogen gas. on the other hand -- styrene -- 200 -- g -- a methacrylic acid -- n - methyl -- 200 -- g -- an acrylic acid -- 50 -- g -- and -- a methacrylic acid -- two - hydroxyethyl -- 50 -- g -- becoming -- a monomer -- mixture -- 500 -- g -- oil solubility -- blue -- a color -- [-- Hodogaya Chemical -- Co., Ltd. -- make -- " -- AIZEN -- SPILONBLUE -- GNH -- " --] -- eight -- g -- distilled water -- 250 -- g -- and -- a polymerization -- a sex -- a surfactant -- [-- Kao -- Co., Ltd. -- make -- " -- radio and TV -- mull -- S - 180 -- " --] -- ten -- g -- mixing -- churning -- distribution -- carrying out -- making -- further -- ammonium persulfate -- two -- g -- dissolving -- making -- mixed liquor -- having prepared . It added over 3 hours under churning in the flask which maintained this mixed liquor near the temperature of 80 degrees C from the above-mentioned liquid separation separating funnel, the polymerization was ended in the 5th hour, and the aqueosity dispersion liquid of a coloring resin particle were obtained. 3000g [of distilled water] and propylene glycol 1000g was added to the aqueosity dispersion liquid of the obtained coloring resin particle, it agitated to homogeneity, and the blue ink constituent of viscosity 3.2cP and surface tension 52 dyn/cm was obtained. The alphabetic character in which the pen using the obtained blue ink constituent was not generated, but notes of blinding was taken was excellent in a water resisting property and lightfastness, and presented clear blue without a blot. The particle diameter of the coloring resin particle in an ink constituent was 0.16 micrometers.

[0045] Example of comparison 5 styrene-maleic resin [ARCO Chemical"SMA-1440 H"(26% of solid content)] 25g, water-soluble red color ["AIZEN CATHILON PINK FGH" by Hodogaya Chemical Co., Ltd.]2g, propylene glycol 20g, and 53g of distilled water were mixed, and the red ink constituent was obtained by carrying out the churning dissolution for 1 hour.

[0046] the example of a comparison -- blue 6 water solubility -- color ["AIZEN VICTORIAPURE BLUE BOH" by Hodogaya Chemical Co., Ltd.]1g, propylene glycol 20g, and 79g of distilled water were mixed, and the blue ink constituent was obtained by carrying out the churning dissolution for 1 hour.

[0047] The red ink constituent was obtained on the same conditions as an example 3 except changing example of comparison 7 pile affinity surface-active-agent ["ADEKA rear soap SE-10N" by Asahi Denka Kogyo K.K.]20g into a surface active agent [5g of sodium dodecylbenzenesulfonate, and polyoxyethylene nonylphenyl ether 5g]. The obtained ink constituents were viscosity 3.1cP and surface tension 37 dyn/cm. The particle diameter of the coloring resin particle in an ink constituent was 0.14 micrometers.

[0048] Without dissolving an oil color in the monomer mixture of example of comparison 8 example 3, the emulsion polymerization was carried out on the same conditions and the aqueous dispersion liquid of a non-colored resin particle were obtained. Then, water-soluble red color ["AIZEN CATHILON PINK FGH" by Hodogaya Chemical Co., Ltd.]5g, 3000g [of distilled water], and propylene glycol 1000g was added, it agitated to homogeneity, and the red ink constituent was obtained.

[0049] The result obtained in each example and the example of a comparison is shown in Table 2.

[0050]

[Table 2]

表 2

	実施例 3	実施例 4	比較例 5	比較例 6	比較例 7	比較例 8
滲 み	○	○	△	×	△	△
耐 水 性	○	○	×	×	△	△
耐 光 性	優	優	不可	不可	優	不可
保存安定性	180日 以 上	180日 以 上	180日 以 上	180日 以 上	180日 以 上	45日 筆記不能

[0051]

[Effect of the Invention] As mentioned above, as explained to the detail, the water-color-ink constituent of this invention is excellent in preservation stability. Moreover, the printing section does not spread, but the ink jet record which used the water-color-ink constituent of this invention for the ink jet recording apparatus, and was acquired gives a clear image, and is excellent in a water resisting property or lightfastness. Without spreading by water or sweat or disappearing, with color mixture, the writing alphabetic character and line which used the water-color-ink constituent of this invention for the writing implement, and were acquired also twist that a color becomes muddy, are clear and do not spread. Moreover, it excels in the water resisting property and lightfastness which do not deteriorate even if it leaves a writing alphabetic character and a line for a long period of time.

[0052] Moreover, since they are coloring emulsion-polymerization liquid obtained by carrying out the emulsion polymerization of the vinyl monomer which dissolved the hydrophobic color beforehand, the aqueous dispersion liquid of the coloring resin particle of this invention present a vivid color, and between long periods of time, a pigment condenses or they do not sediment.

[Translation done.]